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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO.       |
|---|-------------|----------------------|------------------------------|------------------------|
| 10/557,829  | 11/22/2005  | Cheng Ni             | P05,0397                     | 6085                   |
| 26574   | 7590        | 05/03/2007           |                              |                        |
| SCHIFF HARDIN, LLP<br>PATENT DEPARTMENT<br>6600 SEARS TOWER<br>CHICAGO, IL 60606-6473 |             |                      | EXAMINER<br>VARGAS, DIXOMARA |                        |
|   |             |                      | ART UNIT<br>2859             | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>05/03/2007      | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                  |  |
|------------------------------|--------------------------------------|----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/557,829 | <b>Applicant(s)</b><br>NI ET AL. |  |
|                              | <b>Examiner</b><br>Dixomara Vargas   | <b>Art Unit</b><br>2859          |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 November 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/22/05</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plurality of magnetic columns must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

2. Claims 13, 21, 26 and 28 are objected to because of the following informalities: the recitation “being disposed mirror symmetrically” appears to have a typographical error for “being disposed in mirror symmetry”. Appropriate correction is required.
3. Claims 13, 26 and 28 are objected to because of the following informalities: the recitation “with respective to the components” appears to have a typographical error for “with respect to the components”. Appropriate correction is required.
4. Claims 15, 16, 18, 21, 22, 24, 25 and 28-30 are objected to because of the following informalities: the recitation “permanently magnetic columns” appears to have a typographical error for “permanent magnet columns”. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 13-14 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Carlson et al. (US 5,490,509 A).

With respect to claim 13, Carlson discloses a magnetic resonance imaging apparatus comprising (as seen on Figures 1 and 2): a static magnetic field source (#206) having two opposite faces (#102 and #104) connected by a magnetic return structure (#108), said opposite faces facing each other (Figure 1 top portion facing bottom portion) and being separated by a

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space adapted to receive an examination subject therein (#106); first and second assemblies respectively mounted at said opposite faces (#102 and #104), said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed mirror symmetrically, relative to a plane proceeding through said space, with respective to the components in the second assembly (as seen on Figures 1 and 3); said components in each of said first and second assemblies comprising, in a sequence from one of said opposite faces toward said plane, a pole plate in a pole piece (poles #102 and #104), gradient coils having an annular exterior (#202), an RF transmission coil (Figure 4A, #214), a first shimming ring disposed at the annular exterior of said gradient coils (#204), and a second shimming ring disposed at said annular exterior of said gradient coils adjacent to said first shimming ring (#200); and said second shimming ring in each of said first and second assemblies being mounted to allow adjustment of a distance of said second shimming ring from the first shimming ring in that assembly (Column 4, lines 58-65).

7. With respect to claim 14, Carlson discloses the apparatus wherein, said RF transmitting coil has a face facing said plane (Figure 4A, #214), and said second shimming ring has a face facing said plane (#200), with said face of said second shimming ring being no closer to said plane than said face of said RF transmitting coil (Figures 1 and 4A).

8. With respect to claim 26, Carlson discloses a method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising (as seen on Figures 1 and 2): a static magnetic field source (#206) having two opposite faces (#102 and #104) connected by a magnetic return structure (#108), said opposite faces facing each other (Figure 1 top portion facing bottom portion) and being separated by a space adapted to receive an examination subject

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therein (#106); first and second assemblies respectively mounted at said opposite faces (#102 and #104), said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed mirror symmetrically, relative to a plane proceeding through said space, with respect to the components in the second assembly (as seen on Figures 1 and 3); said method comprising the steps of: in each of said first and second assemblies including, in the mirror symmetric components thereof a first shimming ring (#204) and a second shimming ring disposed adjacent to said first shimming ring (#200); and adjustably mounting said second shimming ring relative to said first shimming ring and selectively adjusting a distance between said second shimming ring and said first shimming ring to shim said static magnetic field (Column 4, lines 58-65).

***Allowable Subject Matter***

9. Claims 15-20, 27 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:
  - a. With respect to claim 15, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a magnetic resonance imaging apparatus comprising a space having a center point and wherein said static magnetic field source, at each of said opposite faces, comprises a plurality of groups of permanently magnetic columns respectively having different magnetic energy levels, said columns being disposed substantially symmetrically relative to an axis proceeding

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through said center point and a centered one of said plurality of magnetic columns in each of said first and second assemblies, with the respective magnetic energy levels of said centered ones of said plurality of magnetic columns respectively in said first and second assemblies being equal in combination with the remaining limitations of the claim 13 above.

b. With respect to claims 16-19, the claims have been found allowable due to its dependency on claim 15 above.

c. With respect to claim 20, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a magnetic resonance imaging apparatus comprising in each of said first and second assemblies, a plurality of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts, disposed symmetrically at an exterior edge of at least one of said static magnetic field source, said pole plate, said first shimming ring, or said second shimming ring, to shim the static magnetic field generated by said static magnetic field source in combination with the remaining limitations of the claim 13 above.

d. With respect to claim 27, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising: a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space adapted to receive an examination subject therein; first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being

comprised of a plurality of components with the components in said first assembly being disposed mirror symmetrically, relative to a plane proceeding through said space, with respect to the components in the second assembly; said method comprising the step wherein in each of said first and second assemblies, inserting a symmetrical arrangement of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts in combination with the remaining limitations of the claim 26 above.

e. With respect to claim 30, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising: a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space adapted to receive an examination subject therein; said space having a center point, first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed mirror symmetrically, relative to a plane proceeding through said space, with respect to the components in the second assembly; said method comprising the step wherein in each of said first and second assemblies, inserting a symmetrical arrangement of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts in combination with the remaining limitations of the claim 26 above

11. Claims 21-25 and 28-29 are allowed.

12. The following is an examiner's statement of reasons for allowance:

f. With respect to claim 21, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a magnetic resonance imaging apparatus comprising a plurality of groups of permanently magnetic columns respectively having different magnetic energy levels, said columns being disposed substantially symmetrically relative to an axis proceeding through said center point and a centered one of said plurality of magnetic columns in each of said first and second assemblies, with the respective magnetic energy levels of said centered ones of said plurality of magnetic columns respectively in said first and second assemblies being equal in combination with the remaining limitations of the claim.

g. With respect to claims 22-25, the claims have been found allowable due to its dependency on claim 21 above.

h. With respect to claim 28, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising: a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space adapted to receive an examination subject therein; said space having a center point, first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed mirror symmetrically, relative to a plane proceeding through said space, with respect to the components in the second

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assembly; said method comprising the step of dividing each of said permanently magnetic arrangements into a plurality permanently magnetic columns respectively having different magnetic energy levels, and disposing the plurality of permanently magnetic columns at each of said opposite faces symmetrically relative to an axis proceeding through said center point and oriented perpendicularly to said plane, and making the magnetic energy levels equal for respective permanently magnetic columns in combination with the remaining limitations of the claim.

- i. With respect to claim 29, the claim has been found allowable due to its dependency on claim 28 above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 discloses MR systems with at least one column and at least one shimming coil.

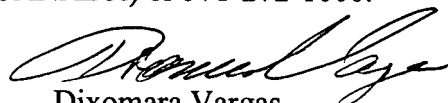
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is 571-272-2252.

The examiner can normally be reached on Mon-Fri 8am-4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Dixomara Vargas  
Patent Examiner  
Art Unit 2859